ATTACHMENT 4 - PROJECT DESCRIPTION

This section includes a complete description of the proposed project and is organized as follows:

- **Background Information on Kings County Water District**
- **Project Description**
  - Project Overview
  - Goals of the Project
  - Needed Facilities
  - Area Covered
  - Detailed Project Description
- **Public Outreach**
  - Collaboration with other Agencies
  - Information Dissemination
- **Need for the Project**
- **New Data and Knowledge**
  - Quality of Information Obtained
  - Data, Methods and Analysis to be Used
  - New Knowledge and Improvement in Groundwater Management
  - Consistency with Groundwater Management Plan
- **On-Going Use**
  - Operation and Maintenance Funding
  - Adaptive Management Strategy

4.1 - Background Information on Kings County Water District

Origin

Kings County Water District was formed in 1954 under the County Water District Act (Water Code sections 30000-33901) to provide a legal entity for water management in the northeast portion of Kings County. Since its inception in 1954, the District has had a dramatic impact on northern Kings County by establishing the foundations of a diverse and flourishing agricultural economy.

Geography

KCWD is located in northeastern Kings County in the central part of the San Joaquin Valley, about 20 miles south of the City of Fresno. The District also surrounds Hanford, the Kings County seat. The District encompasses a land area of approximately 143,000 acres (223 square miles). **Figure 4.1** shows a district location map.

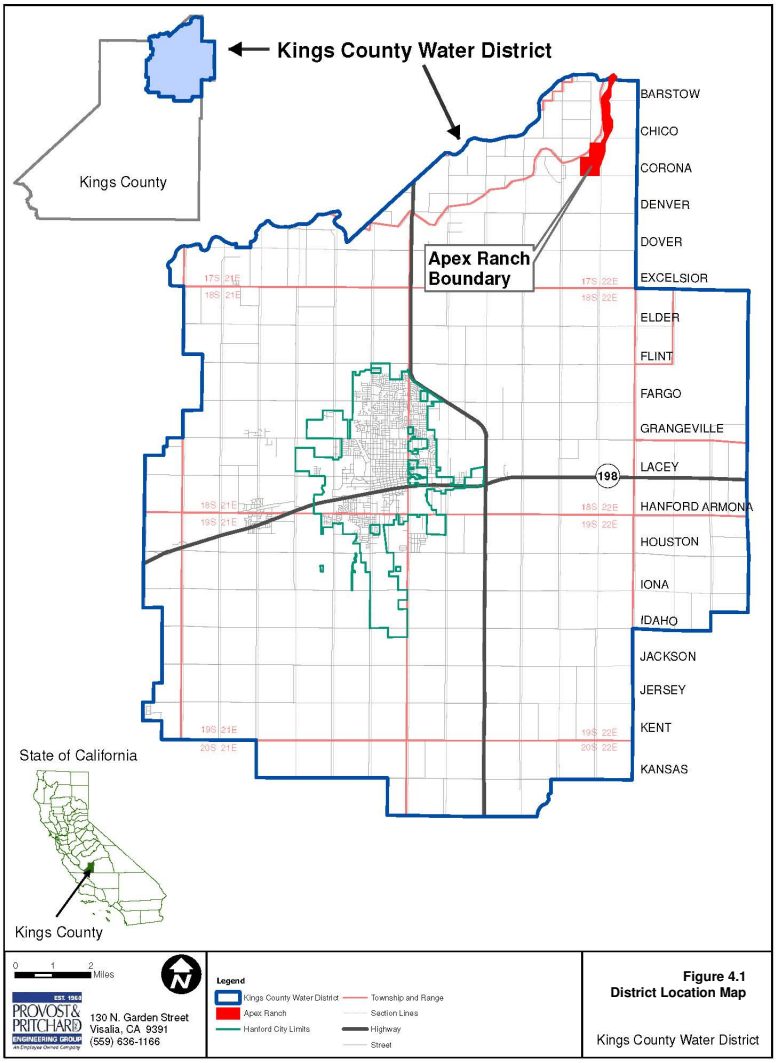


Figure 4.1 – District Location Map

Geology and Hydrogeology

KCWD is located in the Tulare Lake, Kaweah and Kings Groundwater Subbasins (**Figure 4.2**). The generalized stratigraphy includes, from oldest to youngest: basement complex, unconsolidated deposits and topsoil. Recent standing groundwater levels in the unconfined aquifer average about 125 to 140 feet below ground surface (bgs). The groundwater beneath the Kings County Water District (which is extremely good quality for irrigation) is the only firm water supply available within the District. Agriculture, municipalities, and industry all regularly draw upon this valuable resource from individual wells, as surface water supplies are available only on an intermittent basis.

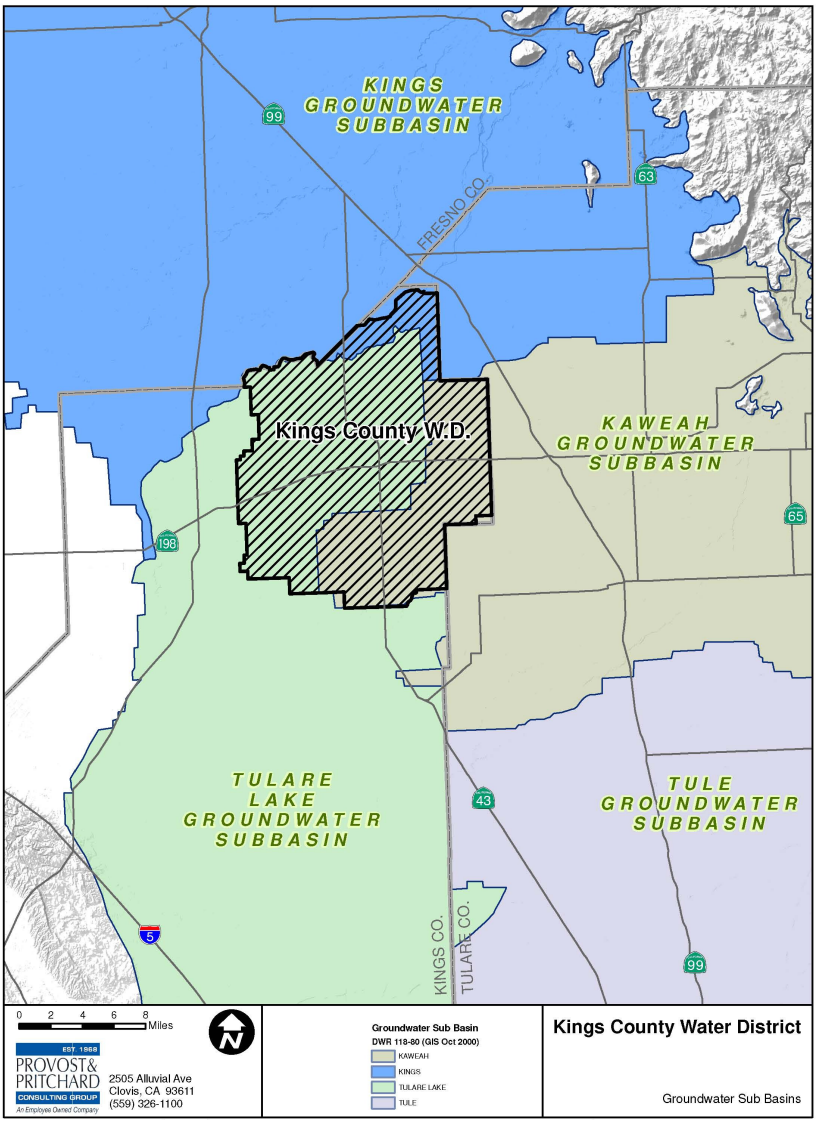


Figure 4.2 – Groundwater Sub-basin Map

Interspersed within the unconsolidated deposits that comprise the useable aquifer in the region are a number of lacustrine clay layers and marsh deposits that can act as confining beds. The confining bed that has greatest significance to Kings County Water District is known as the Corcoran Clay, or E-Clay.

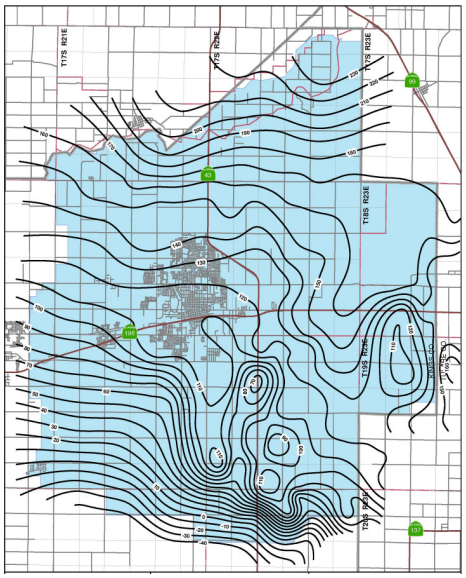
Water Supplies

The District's primary surface water supply comes from the Kings River through ownership of stock in the Peoples Ditch Company and the Last Chance Water Ditch Company, and from the Kaweah River through ownership of shares of Lakeside Ditch Company stock. The Kings County Water District has, since its formation, attempted to purchase all available water stock of these ditch companies to assist in preserving the water rights of the area. KCWD sells the Ditch Company water annually to growers.

The District has also endeavored to divert and recharge as much flood water as possible from the San Joaquin, Kings, and Kaweah Rivers. All of the imported supplies have either recharged the underground aquifer from sinking basins or have been diverted for direct surface irrigation within the District. Kings River water is usually taken in high flows for short durations.

Groundwater Monitoring

Groundwater monitoring in KCWD is divided into two distinct programs: 1) District Wide Monitoring Program and 2) Apex Ranch Conjunctive Use Monitoring Program. District wide monitoring is performed each spring and fall to develop groundwater contour maps and estimate changes in groundwater storage. About 250 wells are included in the monitoring program, primarily privately owned production wells. Monitoring at the Apex Ranch site is performed to improve operations of the groundwater bank and understand recharge rates, groundwater movement, groundwater mounding and pumping drawdowns. This monitoring network includes about 45 wells and is a denser, more intensive program than the District wide monitoring program.



Groundwater Contour Map for KCWD

Climate

The climate of the District is characterized by cool, mild winters and hot, dry summers. Temperatures in the summer often exceed 100 degrees Fahrenheit. Winter low temperatures are typically in the mid-30's, and occasionally drop into the 20's. Average annual precipitation is about 8.5 inches, with 80 percent of the rainfall occurring in the winter months. As a result, agricultural crops are heavily dependent on

irrigation to supply most of their water demands.

Agriculture

Most of the District has been fully developed for irrigated agriculture. Major crops include corn, pasture, cotton, walnuts, peaches and nectarines. The District also includes a large number of dairies.

Conjunctive Use

Conjunctive use of surface water and groundwater has been practiced within the District since its formation in 1954. KCWD performs direct groundwater recharge in 25 recharge basins and through seepage in earthen canals that are left unlined because of their recharge benefit. Through the purchase of slough channels and other appropriate sites for recharge basins, and by the purchase and importation of available surplus waters, the Kings County Water District has attempted to reduce the decline of groundwater levels within the District.

Groundwater Recharge at the Apex Ranch Project

The Apex Ranch Conjunctive Use Project began operations in 2002 and uses 50-acres of dry Kings River channel as a recharge area. Water is percolated and then recovered with wells for delivery to local growers. The project was started after a survey of farmers indicated most would prefer a source of summer water provided through a groundwater bank over winter water deliveries. The project delivers water to a abandoned section of the Kings River that is seldom used. This river channel, called the Old River, has a sandy bottom that is conducive to groundwater recharge. Percolation rates have been measured as high as four feet per day. This abandoned river channel is a rare geographic feature that presents an ideal opportunity for highly productive intentional recharge and groundwater banking.

4.2 - Project Description

Project Overview

The proposed project includes the installation of five nested (multi-level) monitoring wells to improve groundwater monitoring capabilities. Each well casing will be fitted with a pressure transducer (data logger). Water quality will also be sampled in each casing. The hydrogeology and stratigraphy will be characterized using geologic logs, e-logs, and water quality results. The public will be involved through public meetings, a Groundwater Monitoring Committee and a local property owners association. The project is critically needed to fill gaps in an existing monitoring network, provided dedicated monitoring wells not subject to the restrictions of private wells, allow multiple aquifers to be monitored at one location, and provide data over a long-term to evaluate groundwater levels and movement.

Goals of the Project

The broad goals of the project are to install monitoring wells and gather geologic data to strengthen the District's groundwater monitoring capabilities. The project is expected to result in significant amounts of new knowledge and an achievable improvement in groundwater management in KCWD.

Monitoring is considered critical to future management decisions. The District's groundwater monitoring program is intended to:

1. Provide warning of potential future problems
2. Use data generated for water resources evaluations
3. Develop meaningful long-term trends in groundwater characteristics
4. Provide data comparable from place to place in the District

The specific goals and objectives of the groundwater monitoring program are to gather public comment on the program and to plan, design and install five depth-discrete (multi-level) nested monitoring wells, evaluate the findings from their installation and present the findings in a report. The wells will provide benefits to District-wide groundwater monitoring and localized benefit to the Apex Ranch Conjunctive Use project. The long-term general goals for the monitoring wells include:

1. Establish a baseline for future monitoring
2. Fill gaps in District-wide monitoring network
3. Increase capability to measure water levels in multiple aquifers
4. Characterize geographic variability in water quality
5. Use monitoring data in part to compute groundwater stored and withdrawn
6. Provide data needed for graphical, semi-analytical or computer model analysis of groundwater conditions

Goals specific to the Apex Ranch Conjunctive Use Project include:

1. Monitor water quality impacts from groundwater banking
2. Evaluate the effect of groundwater recharge on shallow groundwater levels beneath and adjacent to recharge facilities
3. Determine the impact of recovery well pumping on groundwater levels in nearby wells
4. Use monitoring data to assist in planning and locating future recovery wells

Needed Facilities

The needed facilities for the groundwater monitoring project are five nested monitoring wells. Four wells will include two separate casings and one wells will include three separate casings. The wells and casing depths are summarized in **Table 4.1**.

Table 4.1 – Proposed Monitoring Well Casing Depths

Wells	No. Casings per Well	Casing Depths
MW-P1 MW-P2 MW-P3 MW-P5	2	120 ft, 550 ft
MW-P4	3	120 ft, 245 ft, 550 ft

Each casing will have a 20 foot long screened section. In addition, a data logger will be installed in each of the eleven separate casings to provide continuous water-level monitoring capabilities. More specific details on these facilities can be found below under Detailed Project Description.

The casing depths are based on depths of four existing nested wells in the District. They also represent the approximate depths of well known aquifers in the District. These represent probable depths for the new wells. However, the depths will be confirmed after drilling each borehole, and examining the geologic log and electric-log. The well depths may change slightly so they monitor water from a productive zone, but the potential change will probably not be large, and probably will not have a significant impact on the cost estimate.

Four wells will have two casings and tap the two main aquifers used in the area (intermediate and lower aquifers). One triple completion well is proposed at the Apex Ranch Conjunctive Use Project. In this area intensive monitoring is needed to evaluate

the upper aquifer, which impacts local private wells, the lower aquifer, which groundwater bank wells primarily tap, and the intermediate aquifer, which is partially tapped by private and recovery wells. This triple completion well may provide insight into the exchange of water between the upper and lower aquifer.

Area Covered

The area covered by the proposed project is shown on **Figures 4.3 and 4.4**. **Figure 4.3** shows all of the proposed monitoring wells, and **Figure 4.4** shows a detailed view of existing and proposed monitoring wells at the Apex Ranch project. The new monitoring wells will provide groundwater data in the northeastern portion of the Kings County Water District. Monitoring wells at Apex Ranch will be placed along an east-west transect and cross a dedicated recharge area. Two other monitoring wells will be placed in down-gradient areas, and provide data from multiple aquifers in an area with no dedicated nested monitoring wells.

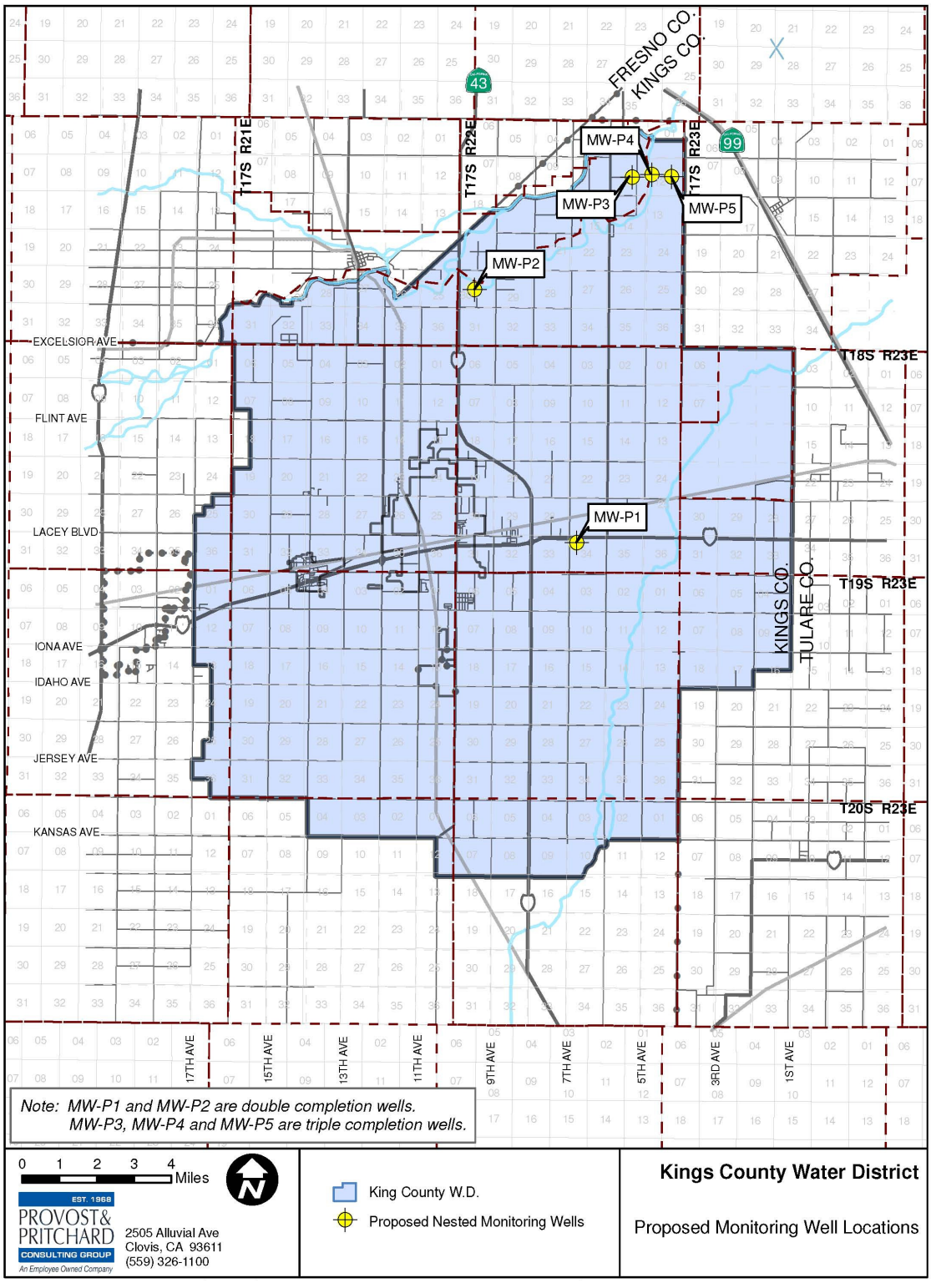


Figure 4.3 – Proposed Monitoring Well Locations

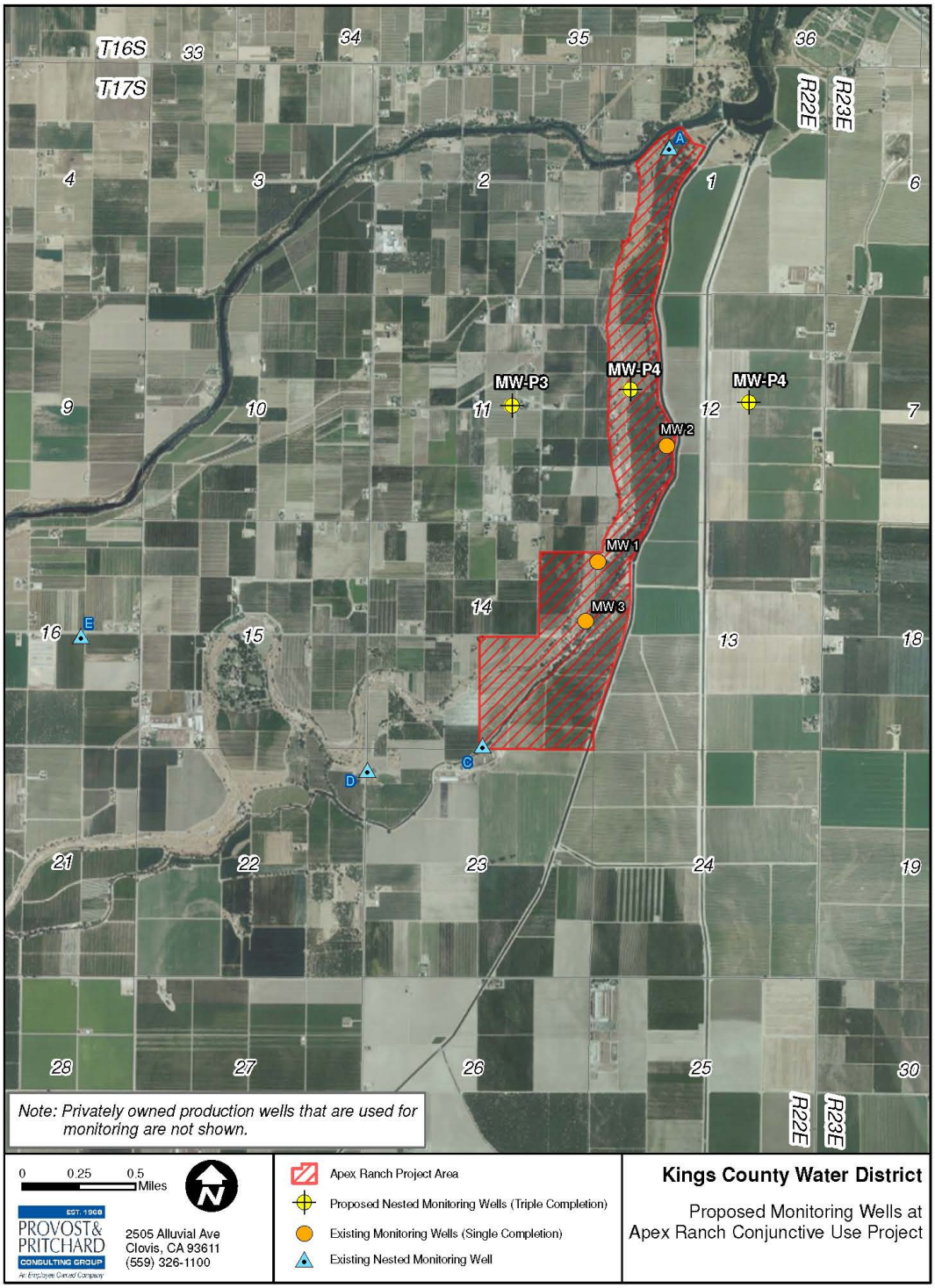


Figure 4.4 – Proposed Monitoring Wells at Apex Ranch Conjunctive Use Project

Detailed Project Description

The project will include construction of five nested monitoring wells in the locations shown on **Figure 4.3**. Each well will have multiple casings as listed in **Table 4.1**. One well will be placed on land owned by KCWD and the other four wells will be placed on county road right-of-ways.

The wells are located in gaps within the existing monitoring network. The network is also lacking a sufficient number of dedicated monitoring wells that are not subject to restrictions of production wells. The nested wells will also improve understanding of complex stratigraphy that includes several aquifers. Data collected from each well will be reported to local, regional and statewide monitoring programs. The wells will benefit both district-wide groundwater management, and enhance understanding of a highly productive groundwater bank. Groundwater is the most important water source in KCWD, and the project will help to improve long-term management of that resource.

The wells will be designed in two phases comprised of conceptual design and final design. The contractor will be required to obtain well drilling and encroachment permits for the wells. A CEQA negative exemption will be filed.

The well contract will be publicly bid. The wells will be drilled using the mud rotary method by an experienced contractor. A geologist will log the soils and a geophysical contractor will perform electric logs in each of the five boreholes. The location and elevation of each well will be surveyed. Each well casing will be fitted with a data logger to provide continuous monitoring capabilities. The water quality in each casing will also be tested for an agricultural suitability analysis, which tests for the primary constituents of interest in the predominantly agricultural area. A detailed hydrogeologic/stratigraphic analysis will characterize the local geology and provide insight into current hydrogeologic conditions.

The project is supported by the KCWD Board of Directors, which is comprised of local farmers and represents the local community. The project is also supported by the Kings River Area Property Owners Association and KCWD Groundwater Monitoring Committee. There is no known opposition to the project. No letters of opposition have been received, and no opposition has been voiced during public meetings.

In 2011, the KCWD Groundwater Management Plan informed the local stakeholders of the proposed project. The vision of installing numerous nested monitoring wells was described in detail in the Groundwater Management Plan (see **Exhibit 4.1** or Appendix D of KCWD GMP (**Exhibit 3.2** of this application)). The GMP includes a map of proposed wells, and discusses the needs, merit, and proposed features of the wells. The GMP was adopted through a formal public process with newspaper notices, website notices, and public hearings. Therefore, the public were made aware of the proposed project as early as 2011. Note that **Exhibit 4.1** shows more wells than are proposed in this application. The network in **Exhibit 4.1** will have to be developed over several years due to funding limitations. The proposed wells include three wells shown

on **Exhibit 4.1** (labeled as Phase I of the proposed network expansion), plus two additional wells to improve groundwater monitoring at Apex Ranch

Public outreach will include presentations at public Board of Directors meetings, meetings with a special Groundwater Monitoring Committee and meetings with representatives from the Kings River Area Property Owners Association. These efforts are intended to inform the public about the project and solicit input.

4.3 – Public Outreach

Collaboration with Other Agencies

The District is located in the Tulare, Kaweah and Kings groundwater sub-basins, which extend beyond many political boundaries and includes other municipalities, irrigation districts, water districts, private water companies and private water users. This emphasizes the importance of inter-agency cooperation, and the District has historically made efforts to work conjunctively with many other water management agencies as described below.

Kaweah Delta Water Conservation District.
The Kaweah Delta Water Conservation District (KDWCD) is a regional water management agency covering 340,000 acres in Tulare and Kings County. Lying within the boundaries of KDWCD are 14 different water agencies and companies. KCWD is a member of the KDWCD and regularly attends their meetings and participates in their regional studies and programs. The KCWD General Manager is also the Board President for KDWCD. KCWD is a participating agency in the KDWCD GMP, which was updated in November 2006 (**Exhibit 3.3**). The KDWCD has a dispute resolution process found in Appendix C of their GMP.

Coordination with Adjacent Water Agencies
Kings County Water District works closely with neighboring agencies through the following efforts:

- Shares groundwater level data and collaborates on groundwater recharge projects with Lakeside Irrigation Water District
- Shares groundwater level data with Alta Irrigation District, Consolidated Irrigation District, and Laguna Irrigation District
- Provides input to the Water Commission that reports directly to the Kings County Board of Supervisors
- Collaborates with three local ditch companies (People's Ditch Company, Last Chance Water Ditch Company, and Lakeside Ditch Company) on flood control, spill-water capture, and groundwater recharge projects.

Kings River Area Property Owners Association
In 2008, several landowners in KCWD formed the Kings River Area Property Owners

Association (KRAPOA) due to their concerns that the Apex Ranch Conjunctive Use Project was adversely impacting their groundwater levels. KCWD has met with KRAPOA on several occasions to resolve these issues and they have jointly developed a revised groundwater monitoring program. KRAPOA was also involved in selecting locations for some of the monitoring wells proposed in this application.

Kings River Water Association

The District is a stockholder in People's Ditch Company and Last Chance Water Ditch Company. Both of these Companies are members of the Kings River Water Association (KRWA), a 28-member group of water agencies that was formed in 1927 to administer and manage water flows on the Kings River. Through their participation in these mutual water companies the District can participate and receives benefits of KRWA membership, which include conflict resolution and improved coordination among member agencies. The KRWA opens lines of communication so that members can work together effectively to utilize, trade- and transfer waters from the Kings River.

Upper Kings Basin Integrated Regional Water Management Authority

KCWD is a member agency in the Upper Kings Basin Integrated Regional Water Management Authority. KCWD regularly attends its meetings and participates in other efforts and projects. The Authority developed an Integrated Regional Water Management Plan in 2007 and will update the plan in 2012.

Kings River Conservation District

KCWD cooperates with the Kings River Conservation District (KRCD) in developing regional groundwater contour maps. KRCD is also the lead agency for compiling and submitting groundwater data to the California State Groundwater Elevation Monitoring Network.

Association of California Water Agencies

KCWD is an active member of the Association of California Water Agencies (ACWA). ACWA fosters cooperation among all interest groups concerned with stewardship of the State's water resources. KCWD attends the ACWA annual meeting and benefits from the educational and informational services that ACWA offers.

Tribal Entities

No tribal entities are located in KCWD.

Dispute Resolution

KCWD has a documented dispute resolution process to resolve groundwater related conflicts. This process addresses three general types of disputes: landowner versus landowner, KCWD versus landowner, and KCWD versus another agency. Details on this dispute resolution process are found on pages 59 to 60 of **Exhibit 3.2**.

Information Dissemination

Information will be disseminated to the State of California, local water agencies, local growers and the general public through a variety of methods. Refer to Section 5.9, which provides a detailed discussion on information dissemination efforts.

4.4 – Need for the Project

The project is critically needed to improve groundwater monitoring capabilities, provide better data on groundwater levels and flows, and increase understanding of the subsurface conditions. The KCWD has recognized the need for these wells for several years and formally documented a plan for the wells in November 2010 (see **Exhibit 4.1**, which is also in the KCWD GMP). Specific reasons the project is needed include:

1. Improve understanding of hydrostratigraphy
2. Improve understanding of groundwater movement
3. Fill gaps in existing monitoring network
4. Need for strategically located, dedicated monitoring wells
5. Lack of nested monitoring wells in District
6. Need for high quality data to aid in improving groundwater budget
7. Importance of groundwater in KCWD

Each of these seven topics is discussed in detail below.

1 – Improve Understanding of Hydrostratigraphy

The District overlies a complex fresh water aquifer system with both horizontally and vertically changing hydrogeologic conditions. The hydrogeologic setting changes from the northeast to the southwest from a largely unconfined aquifer to a more semi-confined aquifer. The District desires a better understanding of this complex aquifer system. This can be achieved by constructing nested wells to monitor the different aquifer components. The geologic logs and electric-logs will also provide data on the stratigraphy. One particular area of interest is the eastern extent of the E-Clay, also called the Corcoran Clay, a major confining layer in the area (see Figure 9 in **Exhibit 3.2**). This figure shows that the limits of the E-Clay are not precisely known and estimates have changed over time. This figure also shows three USGS published estimates from Davis et al. (1957), Croft (1972) and Page (1986). The proposed well construction will provide subsurface data that could help refine knowledge of the limits of the E-Clay.

2 - Improve Understanding of Groundwater Movement

The subsurface investigations and on-going data collection will provide a greater understanding of groundwater flows, impacts of pumping on wells, groundwater

mounding, pumping depressions, vertical movement of groundwater, transmissivity and other aquifer parameters. These need for this data is further elucidated in Appendix E of **Exhibit 4.3** to this application. Current recovery wells pump from a mix of three different aquifers, but recharge primarily benefits the upper aquifer. This creates a complicated scenario with some unknowns about how pumping and recharge is impacting different wells and different aquifers. The District also desires a better understanding of east-west flows at the groundwater Bank. **Figure 4.4** shows that the recharge facilities, and existing monitoring network, are both roughly L-shaped. The monitoring network provides data along the two legs (north-south and east-west) of the recharge area. However, in the northern portion of the project little is known about impacts from recharge or recovery well pumping in an east-west direction. The proposed wells (MW-P3, MW-P4 and MW-P5) are strategically located to address this problem.

3 - Fill Gaps in Monitoring Network

Several areas in KCWD have insufficient groundwater level data, which has forced inferences, leading to generalizations of the areas when analyzed. The current monitoring network consists primarily of private wells that are sited to optimize production and are not necessarily the best places for monitoring. The proposed wells will help to fill these gaps. The five wells have been strategically located in areas of highest need.

4 - Need for Strategically Located, Dedicated Monitoring Wells

KCWD monitors groundwater in about 250 wells, but only six are dedicated monitoring wells. The remaining are privately owned domestic, irrigation or industrial wells, as well as a few recovery wells owned by KCWD. Dedicated monitoring wells have many advantages over production wells for groundwater monitoring, including the following:

- Dedicated monitoring wells eliminate access issues (i.e. locked gates, guard dogs, etc.)
- Groundwater levels are not useful if they are measured in production wells while they are pumping
- Landowners can rescind permission to monitor their wells at any time
- Unreliable conditions at production wells (poor access, pumping, etc.) may result in discontinuous data with information missing in many years
- Monitoring technicians may not know how long pumps have been turned off, and if groundwater has recovered to a normal level
- There may be no way to determine which aquifer is being monitored in construction details (e.g. depth, perforated interval) are missing
- Electronic pressure transducers (data loggers) are easily damaged or lost if production wells
- Dedicated monitoring wells can provide a better picture of groundwater quality over time

- Multiple casings in one location can provide high quality data on peizometric differences between aquifers.

Overall there is increased confidence in the quality of data produced from monitoring wells compared to production wells not designed for monitoring.

5 - Lack of Nested Monitoring Wells in District

The Kings County Water District contains at least 2 or 3 distinct aquifers, depending on the location. Not all of the monitoring wells are completed in the same aquifer, making analysis of groundwater levels, flow directions, change in groundwater storage, and groundwater quality difficult. The proposed nested wells have perforated sections in two major aquifers, and will provide more accurate water level and water quality data. The data will also be useful when evaluating the exchange between the different aquifers.

In July 2011, an independent third-party reviewer recommended that KCWD install nested wells in the District (see Appendix E in **Exhibit 4.3** of this application). On page E-9 they stated:

> "*To further supplement the ability to define the vertical differences in groundwater responses to pumping, it is recommended that dedicated monitoring well clusters be installed in the shallow, intermediate, and deep zone to further distinguish the differences in impacts for each of the zones*"

6 - Need for High Quality Data to Aid in Improving Groundwater Budget

Kings County Water District is located in the Kings, Tulare and Kaweah groundwater sub-basins (see **Figure 4.2**). DWR (2003) has assigned a groundwater budget type of 'C' to the Kings sub-basin, which indicates a low level of knowledge for budget components. In addition, DWR has assigned the Tulare and Kaweah sub-basins to a 'Type B' groundwater budget, which means that enough data is available to estimate groundwater extraction to meet water needs, but insufficient data is available to characterize the groundwater budget. In summary, groundwater budget conditions are not well known in KCWD. The monitoring wells will be a small step in the right direction towards improve our understanding of the groundwater budget.

7 - Importance of Groundwater in KCWD

Groundwater is the most important water supply in KCWD. On average, groundwater comprises about 65% of the water used in KCWD, but can comprise over 80% of water usage in droughts. During years with low surface water allocations, groundwater is essential to prevent the loss of permanent crops and agricultural businesses. Groundwater is also the most dependable water supply in KCWD.

The stress on groundwater in KCWD has increased in recent years due to double and triple cropping, particularly at new dairies. DWR (2003) determined that all three groundwater basins that overlap KCWD are 'critically overdrafted'. In addition, P&P (2011) and Fugro (2007) also determined that the KCWD is in a state of overdraft. Indeed groundwater levels in KCWD have been declining for many years. **Figure 4.5** shows the decline in groundwater levels since 1964.

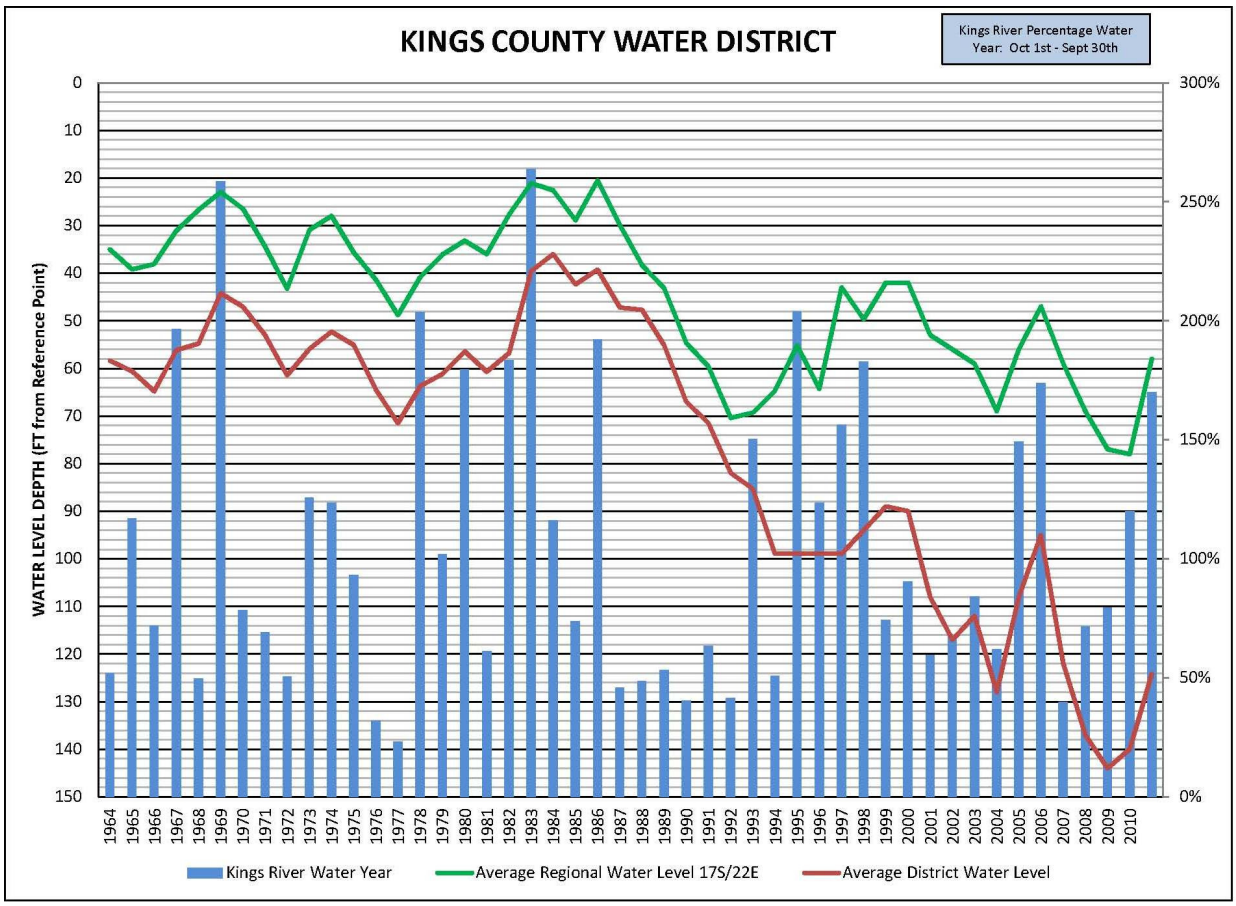


Figure 4.5 – Historical Groundwater Depth in KCWD (1964 – 2011)

Summary

Protecting and preserving groundwater in KCWD is essential. The proposed project will provide data to inform water managers about groundwater conditions, increase knowledge of the local hydrogeology and provide data to more efficiently operate a local groundwater bank.

In summary there is considerable need, and value to be achieved, from implementing the project. The proposed project will have a definite and achievable improvement in long-term groundwater management. The project will also provide a significant quantity of new knowledge that is consistent with the goals and objectives of the KCWD GMP.

4.5 – New Data and Knowledge

Quality of Information Obtained

Several measures are in place to help ensure high quality information will be obtained. These measures are described in other sections of this application and are referenced below:

- Work will be performed using standard and accepted methods and analysis, as described below under 'Data, Methods and Analysis to be Used'.
- The project will be performed according to a detailed and focused Work Plan (**Section 5.4**).
- The quality assurance measures described in **Section 8** will also help to ensure that all information that is gathered is of high quality.
- The public outreach/information dissemination efforts described in **Section 5.9** will help ensure that the project is proceeding in the right direction and that the project provides information that is needed, useful, and understood. Comments, suggestions and criticisms from the stakeholders will be used to improve the project.

Data, Methods and Analysis to be Used

The KCWD will use methods and analysis that are accepted in the engineering and hydrogeologic community, and have proven effective on similar projects in KCWD. These methods are briefly described below, and well be expanded in considerable detail in the project specifications.

Well Drilling

Wells will be drilled by an experienced well driller with a C-57 well driller's license. The wells will be drilled by the reverse-mud rotary method using standard procedures. The contractor shall perform preliminary development by swabbing and airlifting followed by development by pumping. A geologist will oversee construction and development of each well.

Electric Logs

An electric log will be performed in each borehole using an experienced geophysical contractor. The log will include the standard suite of resistivity, spontaneous potential and single point resistivity. The entire borehole will be logged. The contractor shall maintain borehole integrity and circulate fluid to stabilize the borehole until the

geophysical contractor is on site. The logging company shall obtain a sample of circulating fluid for calibration of the logs.

Water Quality Sampling

Water quality samples will be collected from each casing by an experienced technician, geologist or engineer. The samples will be collected according to KCWD's Monitoring Protocol documented in the Groundwater Management Plan (Appendix E in **Exhibit 3.2** of this application). Water quality testing will be performed by accredited, experienced, state-certified testing laboratories to ensure appropriate testing methods and chain of custodies. Travel blank and duplicate samples will be collected to validate the results of the laboratory.

Monitoring Well Designs

The monitoring wells will be based on a previous design for similar nested wells in KCWD, but will be modified as needed for site specific conditions. The previous well design resulted in successful and useful monitoring wells. The well design will follow wellhead protection and well construction standards documented in the KCWD Groundwater Management Plan (page 41 and page 54 in **Exhibit 3.2**). The wells will also be constructed according to the Kings County Well Ordinance.

Hydrogeologic/Stratigraphic Analysis

The hydrogeologic/stratigraphic analysis will be the culminating task for the project and will gather all new data to develop a detailed interpretation of the local hydrogeology. A professional geologist will perform the analysis using geologic logs, e-logs, water quality test results and cross sections. The hydrogeology and stratigraphy will be characterized and compared to published reports and data on other nearby wells.

New Knowledge and Improvement in Groundwater Management

The proposed project will help improve knowledge of the local groundwater and result in a significant improvement in groundwater management.

New Knowledge

The following is a list of new data that will be collected as part of the project, and on-going monitoring:

- Local stratigraphy (from geologic logs)
- Geologic cross section (wells 3 through 5)
- Geophysical logs
- Water quality from separate aquifers
- Groundwater levels from separate aquifers
- Continuous water level measurements from data loggers

- Impacts from water bank operations on water levels
- Inter-aquifer communication
- Impacts from natural Kings River recharge in area of groundwater bank

Improvement in Groundwater Management

The aforementioned data will allow for improved groundwater management in many ways, as described below:

- Groundwater quality will be better understood on a district-wide level, and at the Apex Ranch project site.
- Additional groundwater level data will be available and submitted to four levels of groundwater monitoring:
  - Local - Apex Ranch Monitoring program;
  - District – KCWD groundwater monitoring program;
  - Regional – Kings River Conservation District Regional monitoring program
  - Statewide – California Statewide Groundwater Elevation Monitoring Program
- Additional data will be available to more accurately assess long-term changes in groundwater storage and help address the critical overdraft problem.
- Greater understanding of groundwater banking impacts on nearby water levels, mounding, pumping depressions, and vertical and horizontal groundwater flow.
- More accurate data will be available that is not subject to restrictions or limitations imposed by production wells.

Consistency with Groundwater Management Plan

The proposed project is consistent with several goals and objectives listed in the KCWD Groundwater Management Plan (**Exhibit 3.2**) and KDWCD Groundwater Management Plan as shown in **Table 4.2**.

Table 4.2 – Consistency of Project with Groundwater Management Plan

Kings County Water District Groundwater Management Plan	
pg 6	*"9. Implement a groundwater-monitoring program to provide an "early warning system" to future problems.* *10. Develop groundwater storage facilities to reduce stress on local groundwater reserves during droughts.* *11. Increase knowledge of the local geology and hydrogeology to better understand threats to groundwater quality and quantity."*
pg 27	***"Increase Knowledge of Local Geology and Hydrogeology**. Increase knowledge of the local geology and hydrogeology through technical studies, subsurface investigations, water quality testing, water level monitoring, and land surface monitoring. Gain a better understanding of regional groundwater quality, groundwater overdraft, and groundwater flow conditions. Create a numerical groundwater model and detailed water balance based on the information gained from studies and investigations. Seek funding for these investigations through State and Federal grant programs."*
pg 52	*"Seek grant funds to install dedicated monitoring wells, including nested wells that measure groundwater levels above and below the A Clay and Corcoran Clay."*
Appendix D	This appendix specifically describes the monitoring well plan that is proposed in this application.
Kaweah Delta Water Conservation District Groundwater Management Plan	
pg 29	*" • Monitor groundwater quality* *• Provide effective and efficient management of groundwater recharge projects, facilities and programs"*

4.6 – On-going Use

Operation and Maintenance Funding

The KCWD has adequate funding to continue monitoring the new wells in the long-term and has adequate funding to address well maintenance. After completion of the project on-going monitoring and maintenance will be added to the duties of the existing District staff. Extra staff will not be needed to cover these additional work requirements. The

requested funding will provide fully functioning facilities, not dependent on additional funds to be used.

Groundwater Monitoring and Maintenance Funds

Exhibit 4.2 includes the 2011-2012 annual budget for KCWD. This budget is typical of past years and future years are expected to have similar budget categories and amounts. The budget includes two categories that are currently used for groundwater management and monitoring, as shown in **Table 4.3**.

Table 4.3 – Groundwater Management Budget

No.	Description	Budget
5186	GW Mngt Plan	$40,000
5305	Apex Operation	$90,000

On-going Monitoring

Groundwater levels will be monitored continuously using the data loggers, and the data will be retrieved monthly. Groundwater quality will be monitored approximately once per year. However, on-going monitoring will require minimal effort and cost. The wells will be monitored with approximately 300 other wells that are part of the District's monitoring effort. The costs to monitor the new wells can easily be accommodated with the available budgets listed in **Table 4.3**.

Monitoring Well Maintenance

The monitoring wells will be constructed according to standard practices to ensure quality and lasting construction. They will also be constructed next to existing facilities, such as telephone poles, to reduce the potential from damage from vehicles. Thus, it is anticipated the wells will have a significant design life and maintenance costs will be minimal. Annual maintenance costs for the wells are assumed to be 0.5% to 1.5% of the construction cost per year[1]. Assuming maintenance costs of 1% per year, and a construction cost of $180,000, the annual maintenance costs would be $1,800/year. These costs can also be easily accommodated with the budgets listed in **Table 4.3**.

Adaptive Management Strategy

Adaptive management of groundwater will be accomplished through the Groundwater Monitoring Committee, Kings River Area Property Owners Association, and KCWD Dispute Resolution Policy.

Groundwater Monitoring Committee

The KCWD Groundwater Monitoring Committee is responsible for establishing monitoring protocols, reviewing and approving annual monitoring reports, and recommending changes to the monitoring program. The Committee meets twice

[1]Jensen, M. E. '*Design and Construction of Farm Irrigation Systems*", 1980, pg 58.

annually and has been instrumental in developing the District's current monitoring program. Each year the committee makes formal changes to the monitoring program. For example, Appendix F in **Exhibit 4.3** of this application includes '*Groundwater Monitoring Program 2012 Update to 2004 Guidelines*'.

Kings River Area Property Owners Association

The Kings River Area Property Owners Association has played a significant role in helping KCWD improve their monitoring program. The Association was formed over citizen concerns that District groundwater pumping was adversely impacting their wells. The Association, in cooperation with KCWD, revised the District's monitoring program in 2011 (see Appendix F in **Exhibit 3.2** to this application). KRAPOA and KCWD will continue to work together to identify ways to improve and adapt the monitoring network.

Dispute Resolution Policy

The Kings County Water District has a documented and proven dispute resolution process that can be used to adapt project operations, if necessary. The dispute resolution process covers three types of disputes: 1) Landowner versus Landowner; 2) District versus Landowner; and 3) District versus Another Agency. This process is described on pages 59 to 60 in the KCWD Groundwater Management Plan (**Exhibit 3.2**). If groundwater disputes arise, then the monitoring program, including use of the new monitoring wells, may be modified to improve groundwater management.

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MEMORANDUM

To: Kings County Water District

From: Brian Ehlers, Shay Overton

Subject: **Proposed Nested Monitoring Wells for KCWD**

Date: November 3, 2010

Problem Statement

Kings County Water District has been monitoring groundwater conditions using an array of approximately 200 agricultural wells for many years. Time of use of irrigation wells and wells completed in multiple aquifers have tended to make analysis of groundwater levels and flow directions, overdraft and groundwater quality monitoring difficult. In addition, conjunctive use efforts in the Old River Channel have generated the need for high quality water level data in that area.

Recommendation

The Kings County Water District (KCWD or District) is proposing to install up to 10 nested monitoring wells on District owned lands in strategic locations within District boundaries. The nested monitoring wells will likely be triple completion wells installed in three tentatively identified aquifers, where applicable, beneath the District. Installation of the wells will proceed in two separate phases with the first three wells being constructed in Phase 1 and the remainder constituting Phase 2 or future phases. This memorandum outlines the potential benefits of dedicated monitoring wells, the tentative location of the wells and the anticipated depth intervals of the perforations for the individual casings in the nested monitoring wells.

Potential Benefits of Dedicated Nested Monitoring Wells

1. Depth Discrete Water levels – Static water levels could be obtained for identified aquifer zones. Additionally, static water levels from the monitoring wells could be used to aid the District in ongoing efforts to generate District wide groundwater contour maps. The monitoring wells could be used to supplement information from the indicator wells.

2. Ease of access – The wells will be located on District owned lands for ease of access.

3. Static Water Levels – Static Water Levels could be readily determined as the wells would not be used to generate water for consumptive use.

4. Increase Knowledge of Aquifer System – Accurate static water levels for identified aquifer zones would aid the District in understanding the regional aquifer system; helping to inform decisions on groundwater management.

5. Dedicated Transducers – Dedicated Transducers in the monitoring wells will give a continuous record of water level changes.

6. Strategic Location of Monitoring Wells – The nested monitoring wells can be strategically located to generate information on the amount and quality of groundwater flowing into and out of the District.

7. Permanent Locations for Groundwater Quality Monitoring and Assessment – The monitoring wells can be used to readily sample groundwater quality, thus establishing permanent groundwater water quality sampling locations. This would enable the District to assess changes to groundwater quality through time, as well as assessing differential groundwater quality for each identified aquifer zone.

8. Differentiate Horizontal Changes in Groundwater Quality – In casings identified as being perforated in the same aquifer zones the nested monitoring wells can be used to analyze regional horizontal changes in groundwater in the unconfined and confined aquifer.

9. Perched Groundwater Monitoring – In areas of perched groundwater shallow casings can be used to monitor groundwater quality and depth of the perched water.

10. Optional Deep Casing – In the southern part of the District, where water levels have historically been deepest, a casing completed to just above the saline water can be used to monitor possible vertical migration of saline, connate marine water.

11. Boring Logs and E logs – Boring Logs and E-logs from the monitoring wells could help the District better understand the northeast limits of the Corcoran clay and other regional hydrogeologic features.

Potential Locations and Casings Depths of Nested Monitoring Wells

The District overlies a complex fresh water aquifer system with both horizontally and vertically changing hydrogeologic conditions. The hydrogeologic setting changes from the northeast to the southwest from a largely unconfined aquifer to a more semi-confined to confined aquifer. The intent of Phase 1 monitoring wells will be to monitor groundwater conditions in areas that have been identified as critical (see Attachment). Future Phases or Phase 2 would include wells with locations largely driven by a need to

better understand horizontal and vertical changes in the hydrogeologic setting. The following is a general discussion on the theory behind the location of the monitoring wells and the tentative depth of the individual casings.

In areas underlain by the A clay and the Corcoran clay (southwestern portion of the District) three fresh water aquifers are recognized; a perched aquifer, an unconfined to semi-confined aquifer, and a confined aquifer. The perched aquifer is above the A clay from the shallow water table to depths of 30 to 60 feet bgs. The unconfined to semi-confined aquifer is below the A clay down to the top of the Corcoran clay to depths approaching 500 feet bgs in the southwest portions of the District. The confined aquifer is below the Corcoran clay to the base of fresh water ranging from about 240 feet bgs at the northern limit of the Corcoran clay to depths approaching 550 feet bgs in the southwest portion of the District to the base of fresh water which is about 3,400 feet bgs. In this area the individual casings for each well would be completed as follows. One casing would be perforated above the A clay in the perched aquifer from the top of the perched water table to about 30 to 60 feet bgs, one casing would be perforated between the A clay and the Corcoran clay solely in the unconfined to semi-confined aquifer, tentatively from depths ranging from about 250 feet to 500 feet. The deepest set casing would be perforated below the Corcoran clay in the confined aquifer and could be perforated as deep as 550 to 600 feet bgs depending on location and e-log verification of depth to the Corcoran clay.

In areas east of the A clay but within the eastern limit of the Corcoran clay, two clear aquifers are recognized; the unconfined aquifer above the Corcoran clay and the confined aquifer below. In these areas one deep casing would be perforated below the Corcoran clay in the confined aquifer in the depth range from about 250 to 400 feet bgs. The depth of the perforated interval will be determined after the final locations are known. An intermediate depth casing would be perforated in the unconfined aquifer immediately above the Corcoran clay (in the 180 to 250 feet bgs range), and another casing would be set at or just below the water table, with the depth largely dependent on the location of the water table.

There is some debate as to the northeastern extent of the Corcoran clay. The northeastern extent, traditionally used by the District is shown on the attached figure. In areas where there is no clear differentiation of the aquifers based on the presence of the clay layers, ie north of the northeastern extent of the Corcoran clay, the depth of the perforated interval would be determined by sight specific analysis of boring logs or E logs. As it is widely recognized that the unconfined aquifer becomes more confined with depth and increasingly confined in the southwestern part of the District, successive casings could be completed at depths enabling information to be obtained on the amount of confinement with depth in the unconfined aquifer. Alternatively, casing perforated intervals could be at depths to monitor aquifer zones of concern in a given vicinity.

Table 1 - Approximate Intervals for Perforated Depths of Casings and Depths of Aquifers

Aquifer	Depth to Top of Aquifer (ft) [1]	Depth to Bottom of Aquifer (ft) [1]	Casing Depth (ft)[2]
Perched	Perched Water Table	30 to 60	Perched Water Table to 60
Unconfined[3]	80	500	180 to 500
Confined	240	3,400	250 to 600

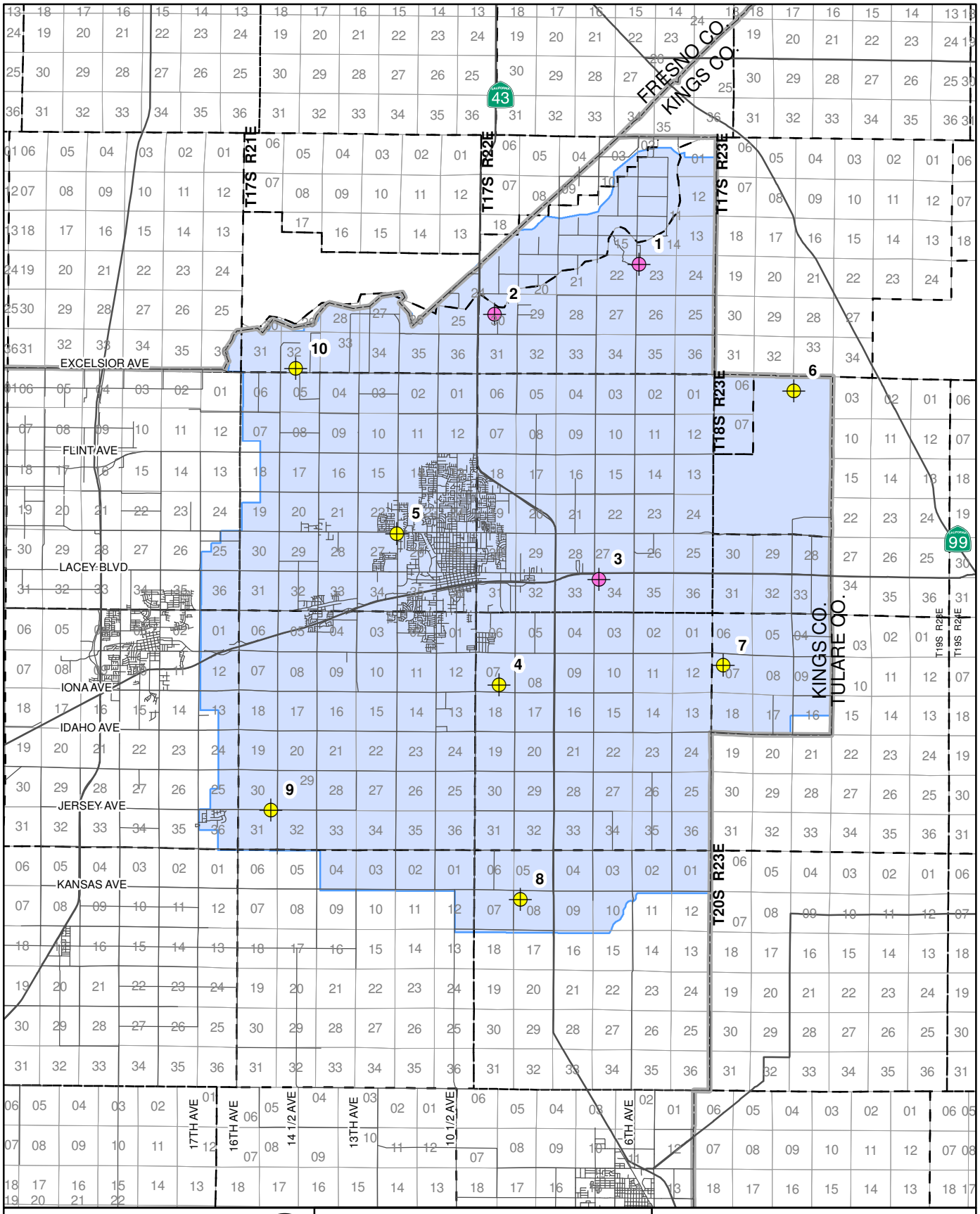
Notes
[1] – The depth of the A clay and Corcoran clay increase to the southwest across the District, thus the depths provided here cover the range of values.
[2] – The depth of casings in the unconfined and confined aquifers is highly variable depending on location, therefore the depth ranges provided here appear to overlap.
[3] – The depth to the top of the unconfined aquifer is dependent on the amount recharge and discharge. The depth to the top of casings perforated in this zone will be determined by field conditions

Phase 1

Phase 1 Wells are to be located in three areas previously identified as critical. Locations 1 and 2, on the attached map, were chosen to monitor groundwater conditions down gradient of conjunctive use efforts along the Old River Channel. Location 1 is in the northwest part of Section 23, T. 17S/R. 22E. Location 2 is in the center of Section 30, T. 17S/R. 22E. These locations are also ideally located to obtain information on the quality of water flowing into the northern parts of the District. Location 3, the southeast corner of Highway 198 and 7th Avenue at the new Garner recharge basin, was chosen to enable monitoring of groundwater conditions in the central portions of the District. In addition, near this location, Caltrans has been monitoring subsidence along Highway 198. The location of this monitoring well will enable analysis of groundwater conditions as they relate to subsidence. The shallow casing could be used to monitor the near surface groundwater changes when the new basin is actively recharging water.

Future Phases or Phase 2

Wells constructed in future phases would be located to obtain information on the groundwater conditions from a District wide perspective. The wells would be located to generate information on groundwater flowing into and out of the District, monitor areas of concern within the District, and the effects of municipal consumptive use of groundwater resources.



0 1 2 3 4 Miles

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Legend

Proposed Monitoring Network

- Phase 1 Well Locations
- Phase 2 or Future Phases M.W. Location

Kings County Water District

Proposed Monitoring Well Locations

EXHIBIT 4.2

Kings County Water District
2011-2012 Actual Budget

G.L. #	Account Name	2011-2012 Budget	July	August	September	1st Quarter	October	November	December	2nd Quarter	January	February	March	3rd Quarter	April	May	June	4th Quarter	Total	Total Percent	Available Balance
5000	Regular Employees	$235,000.00	$ 18,325.00	$ 18,325.00	$ 21,537.04	$ 58,187.04	$ 18,325.00	$ 18,325.00	$ 18,325.00	$ 54,975.00	$ 18,325.00	$ 21,560.20	$ 18,325.00	$ 58,210.20	$ 19,366.66	$ 19,366.66	$ 19,366.66	$ 58,099.98	$ 229,472.22	98%	$ 5,527.78
5030	Pension Fund	$17,000.00	$ 1,304.17	$ 1,304.17	$ 1,304.17	$ 3,912.51	$ 1,304.17	$ 1,304.17	$ 1,304.17	$ 3,912.51	$ 1,304.17	$ 1,512.50	$ 5,054.07	$ 7,870.74	$ 1,616.67	$ 1,616.67	$ 1,616.67	$ 4,850.01	$ 20,545.77	121%	$ (3,545.77)
5040	Health Insurance	$25,000.00	$ 2,004.70	$ 2,004.70	$ 2,004.70	$ 6,014.10	$ 2,004.70	$ 2,004.70	$ 2,004.70	$ 6,014.10	$ 2,056.52	$ 2,108.34	$ 2,056.52	$ 6,221.38	$ 2,056.52	$ 2,056.52	$ 2,056.52	$ 6,169.56	$ 24,419.14	98%	$ 580.86
5045	Disability Insurance	$2,000.00	$ 120.95	$ 120.95	$ 120.95	$ 362.85	$ 142.15	$ 120.95	$ 120.95	$ 384.05	$ 120.95	$ 120.95	$ 142.30	$ 384.20	$ 120.95	$ 127.82	$ 127.82	$ 376.59	$ 1,507.69	75%	$ 492.31
5050	Social Security	$18,000.00	$ 1,768.37	$ 1,768.33	$ 2,078.35	$ 5,615.05	$ 1,386.38	$ 403.03	$ 828.80	$ 2,618.21	$ 1,768.37	$ 2,080.54	$ 1,768.37	$ 5,617.28	$ 1,868.88	$ 1,868.87	$ 1,868.90	$ 5,606.65	$ 19,457.19	108%	$ (1,457.19)
5055	Workmans Comp.	$3,000.00		$ 579.00		$ 579.00	$ 628.00			$ 628.00	$ 589.00			$ 589.00	$ 628.00			$ 628.00	$ 2,424.00	81%	$ 576.00
5060	Insurance	$15,000.00			$ 11,566.00	$ 11,566.00				$ -			$ 1,579.00	$ 1,579.00				$ -	$ 13,145.00	88%	$ 1,855.00
5080	Maintenance Yard	$5,000.00	$ 225.00	$ 225.00	$ 225.00	$ 675.00	$ 225.00	$ 225.00	$ 225.00	$ 675.00	$ 225.00	$ 225.00	$ 225.00	$ 675.00	$ 225.00	$ 225.00	$ 1,125.00	$ 1,575.00	$ 3,600.00	72%	$ 1,400.00
5090	Maintenance Janitoral	$3,000.00	$ 160.00	$ 200.00	$ 160.00	$ 520.00	$ 160.00	$ 200.00	$ 160.00	$ 520.00	$ 200.00	$ 160.00	$ 160.00	$ 520.00	$ 200.00	$ 160.00	$ 160.00	$ 520.00	$ 2,080.00	69%	$ 920.00
5091	Maintenance Truck	$3,000.00	$ 1,337.31	$ 871.82	$ 720.57	$ 2,929.70	$ 3.00	$ 60.63	$ 137.06	$ 200.69		$ 48.02	$ 44.26	$ 92.28	$ 140.25	$ 722.20	$ 124.44	$ 986.89	$ 4,209.56	140%	$ (1,209.56)
5092	Maintenance S I G	$8,000.00	$ 54,820.25	$ 23,919.37		$ 78,739.62			$ 140.56	$ 140.56	$ 145,351.09		$ 4,275.96	$ 149,627.05	$ 90,906.08	$ 397.75	$ 73.00	$ 91,376.83	$ 319,884.06	3999%	$ (311,884.06)
5095	Maintenance Riverside	$50,000.00	$ 3,787.68	$ 2,515.16	$ 1,145.23	$ 7,448.07	$ 5,682.91	$ 847.05	$ 822.91	$ 7,352.87	$ 1,961.66	$ 4,175.00	$ 800.00	$ 6,936.66	$ 1,100.00	$ 1,100.00	$ 4,119.15	$ 6,319.15	$ 28,056.75	56%	$ 21,943.25
5096	Maintenance Garner Basin	$50,000.00				$ -				$ -				$ -	$ 2,400.00			$ 2,400.00	$ 2,400.00	5%	$ 47,600.00
5120	Office Expense	$5,000.00	$ 212.64	$ 228.01	$ 236.89	$ 677.54	$ 80.35	$ 154.01	$ 32.21	$ 266.57	$ 678.19	$ 229.59	$ 633.95	$ 1,541.73	$ 367.91	$ 486.08	$ 53.65	$ 907.64	$ 3,393.48	68%	$ 1,606.52
5140	Director Fees	$7,000.00	$ 500.00	$ 400.00	$ 650.00	$ 1,550.00	$ 500.00	$ 300.00	$ 300.00	$ 1,100.00	$ 600.00	$ 950.00	$ 100.00	$ 1,650.00	$ 650.00	$ 400.00	$ 400.00	$ 1,450.00	$ 5,750.00	82%	$ 1,250.00
5160	Contract Services	$8,000.00	$ 20.00	$ 20.00	$ 20.00	$ 60.00	$ 366.92	$ 20.00	$ 20.00	$ 406.92	$ 20.00	$ 470.00	$ 20.00	$ 510.00	$ 20.00	$ 25,279.00	$ 20.00	$ 25,319.00	$ 26,295.92	329%	$ (18,295.92)
5170	Dues & Subs.	$20,000.00	$ 250.00			$ 250.00	$ 7,499.00	$ 5,000.00	$ 5,465.00	$ 17,964.00			$ 5,000.00	$ 5,000.00	$ 150.00	$ 250.00		$ 400.00	$ 23,614.00	118%	$ (3,614.00)
5180	Engineering - General	$35,000.00	$ 2,670.00	$ 595.00	$ 765.00	$ 4,030.00	$ 935.00	$ 6,002.26	$ 9,469.10	$ 16,406.36	$ 4,267.62	$ 2,346.94	$ 4,045.00	$ 10,659.56		$ 765.00		$ 765.00	$ 31,860.92	91%	$ 3,139.08
5186	G W Mngt. Plan	$40,000.00	$ 2,608.93	$ 1,634.00	$ 1,138.76	$ 5,381.69	$ 1,329.44	$ 306.19	$ 8,100.01	$ 9,735.64	$ 3,755.36	$ 1,594.95	$ 8,740.75	$ 14,091.06	$ 3,471.06	$ 156.00		$ 3,627.06	$ 32,835.45	82%	$ 7,164.55
5190	Legal Expense	$18,000.00	$ 843.05	$ 1,332.40		$ 2,175.45	$ 2,232.45	$ 1,072.80	$ 1,311.00	$ 4,616.25		$ 2,263.17	$ 3,194.30	$ 5,457.47	$ 2,210.80		$ 2,271.20	$ 4,482.00	$ 16,731.17	93%	$ 1,268.83
5200	Basin Rental	$4,000.00				$ -				$ -		$ 750.00		$ 750.00				$ -	$ 750.00	19%	$ 3,250.00
5210	Water Rental	$50,000.00				$ -			$ 13,265.85	$ 13,265.85	$ 38,484.80	$ 5,461.80		$ 43,946.60				$ -	$ 57,212.45	114%	$ (7,212.45)
5221	Peoples Assmt.	$120,000.00	$ 27,115.17			$ 27,115.17	$ 24,855.54			$ 24,855.54	$ 30,504.52			$ 30,504.52	$ 35,023.70			$ 35,023.70	$ 117,498.93	98%	$ 2,501.07
5222	Settlers Assmt.	$26,000.00	$ 6,350.59			$ 6,350.59	$ 6,724.17			$ 6,724.17	$ 6,724.17			$ 6,724.17	$ 7,471.28			$ 7,471.28	$ 27,270.21	105%	$ (1,270.21)
5223	Last Chance Assmt.	$250,000.00	$ 35,591.12			$ 35,591.12		$ 118,126.88		$ 118,126.88				$ -	$ 118,126.89			$ 118,126.89	$ 271,844.89	109%	$ (21,844.89)
5224	Lakeside Assmt.	$35,000.00			$ 8,503.76	$ 8,503.76			$ 10,728.37	$ 10,728.37			$ 11,158.94	$ 11,158.94			$ 8,934.33	$ 8,934.33	$ 39,325.40	112%	$ (4,325.40)
5226	Lemoore Canal Assmt.	$1,000.00		$ 160.00		$ 160.00	$ 160.00			$ 160.00		$ 160.00		$ 160.00	$ 160.00		$ 160.00	$ 320.00	$ 800.00	80%	$ 200.00
5228	New Deal Assmt.	$10,000.00				$ -			$ 8,167.50	$ 8,167.50				$ -				$ -	$ 8,167.50	82%	$ 1,832.50
5229	Lone Oak Assmt.	$35,000.00				$ -	$ 1,120.00		$ 48,225.00	$ 49,345.00				$ -				$ -	$ 49,345.00	141%	$ (14,345.00)
5230	Surf. Water Purchase	$100,000.00	$ 15,075.85			$ 15,075.85			$ 55,784.40	$ 55,784.40				$ -		$ 1,695.53		$ 1,695.53	$ 72,555.78	73%	$ 27,444.22
5235	Land Purchase	$150,000.00			$ 156.00	$ 156.00				$ -				$ -				$ -	$ 156.00	0%	$ 149,844.00
5240	Environ./Education	$10,000.00		$ 325.00		$ 325.00	$ 40.00	$ 160.00		$ 200.00	$ 100.00	$ 60.00	$ 5,000.00	$ 5,160.00				$ -	$ 5,685.00	57%	$ 4,315.00
5245	Advertising	$1,000.00				$ -				$ -			$ 664.00	$ 664.00				$ -	$ 664.00	66%	$ 336.00
5255	Office Equipment	$3,000.00				$ -				$ -				$ -				$ -	$ -	0%	$ 3,000.00
5260	Car Allowance	$1,000.00	$ 50.00	$ 50.00	$ 50.00	$ 150.00	$ 50.00	$ 50.00	$ 50.00	$ 150.00	$ 50.00	$ 50.00	$ 50.00	$ 150.00	$ 50.00	$ 50.00	$ 50.00	$ 150.00	$ 600.00	60%	$ 400.00
5270	Travel	$9,000.00	$ 1,414.69	$ 1,696.28	$ 1,088.64	$ 4,199.61	$ 760.65	$ 1,185.42	$ 616.43	$ 2,562.50	$ 929.82	$ 925.02	$ 1,214.43	$ 3,069.27	$ 2,291.91	$ 1,224.69	$ 1,001.96	$ 4,518.46	$ 14,349.84	159%	$ (5,349.84)
5280	Conference	$3,000.00				$ -		$ 500.00		$ 500.00				$ -		$ 500.00		$ 500.00	$ 1,000.00	33%	$ 2,000.00
5290	Utilities	$90,000.00	$ 699.75	$ 862.00	$ 1,138.36	$ 2,700.11	$ 738.73	$ 718.84	$ 813.04	$ 2,270.61	$ 852.85	$ 1,196.08	$ 1,104.94	$ 3,153.87	$ 34,163.35	$ 1,286.07	$ 46,501.10	$ 81,950.52	$ 90,075.11	100%	$ (75.11)
5305	Apex Operation	$90,000.00	$ 2,873.00	$ 20,594.07	$ 18,898.42	$ 42,365.49	$ 13,473.16	$ 17,247.49	$ 193,190.41	$ 223,911.06	$ 16,742.53	$ 24,045.88	$ 36,767.09	$ 77,555.50	$ 24,623.78	$ 47,992.38	$ 23,847.70	$ 96,463.86	$ 440,295.91	489%	$ (350,295.91)
5330	Stock Purchase	$60,000.00				$ -				$ -				$ -				$ -	$ -	0%	$60,000.00
5350	Equipment Purchase	$20,000.00	$ 84.62			$ 84.62				$ -				$ -				$ -	$ 84.62	0%	$19,915.38
	TOTALS	$1,635,000.00	$180,212.84	$79,730.26	$73,507.84	$ 333,450.94	$ 90,726.72	$ 174,334.42	$ 379,607.47	$ 644,668.61	$ 275,611.62	$ 72,493.98	$ 112,123.88	$ 460,229.48	$ 349,409.69	$ 107,726.14	$ 113,878.10	$ 571,013.93	$ 2,009,362.96	123%	$ (374,362.96)
All	X-tra Water Sales					$ -				$ -				$ -				$ -	$ -		$ (236,242.96)
	Water Purchase Sales				($138,120.00)	$ (138,120.00)				$ -				$ -				$ -	$ (138,120.00)		
	Adjusted Totals	$1,635,000.00	$180,212.84	$79,730.26	($64,612.16)	$ 195,330.94	$ 90,726.72	$ 174,334.42	$ 379,607.47	$ 644,668.61	$ 275,611.62	$ 72,493.98	$ 112,123.88	$ 460,229.48	$ 349,409.69	$ 107,726.14	$ 113,878.10	$ 571,013.93	$ 1,871,242.96	114%	$ (236,242.96)